

4160 disposed over the physical keypad 4140, and a second surface display device 4180 disposed over the touchscreen panel 4160. The physical keypad 4140 in the present embodiment may include physical keys 4145 defined by a material that changes shape under the influence of an electric or magnetic field. For example, the physical keys 4145 may be made of a piezoelectric material, such as, for example, quartz, or a magnetostrictive material, such as, for example, ferromagnetic thin films. In the embodiment shown in FIG. 19, the physical keys 4145 are defined by a grid structure 4146 of piezoelectric material formed within the physical keypad 4140. Thus, the grid structure 4146 may either deflect downwards or upwards under the application of an electric field, thereby forming protrusions or indentations around the physical keys 4145. Thus, in the keyboard-enabled mode, the user is able to feel the location of the physical keys 4145. Any number of physical keys 4145 may be formed on the physical keypad 4140. In an exemplary embodiment, the number and shape of the physical keys 4145 are made to correspond to the number and shape of the imaged keys in the imaged keyboard that may be displayed by the first surface display device 4130. Thus, when the interactive display 4100 is in the keyboard-enabled mode, a user is able to feel the location of the various imaged keys based on the tactile feedback provided by the physical keys 4145.

[0125] As in the previous embodiment, the interactive display 4100 may also include a sensor 4170 that detects user interaction with the physical keypad 4140. The sensor 4170 may generate electrical signals based on the detected user interaction, and the generated signals may be sent to an image generator. The image generator may use the generated signals to display in the imaged keypad an imaged representation of the user interaction.

[0126] Now that the preferred embodiments of the present invention have been shown and described in detail, various modifications and improvements thereon will become readily apparent to those skilled in the art. Accordingly, the spirit and scope of the present invention is to be construed broadly and limited only by the appended claims and not by the foregoing specification.

What is claimed is:

1. An electronic device comprising:

an interactive display that comprises:

an image display device disposed at a first surface of the electronic device, the image display device configured to display a plurality of imaged keys; and

a physical keypad disposed at a second surface of the electronic device, the physical keypad comprising a plurality of physical keys, wherein:

the plurality of physical keys perform a different function from the plurality of imaged keys so that the plurality of physical keys and the plurality of imaged keys form a combination keyboard, wherein the plurality of physical keys comprise

only one of: 1) modifier, navigation, lock, editing and navigation keys; or 2) alphanumeric keys, and the plurality of imaged keys comprise only one of the other of: 1) modifier, navigation, lock, editing and navigation keys; or 2) alphanumeric keys.

2. The electronic device of claim 1, wherein:

the interactive display has a keyboard-enabled mode and a keyboard-disabled mode,

in the keyboard-disabled mode, the image display device displays the plurality of imaged keys and the physical keypad is disabled so that the plurality of physical keys are lowered relative to the second surface and the physical keypad does not provide tactile feedback to a user,

in the keyboard-enabled mode, the image display device does not display the plurality of imaged keys and displays other image data, and the plurality of physical keys of the physical keypad are raised relative to the second surface to provide tactile feedback to a user.

3. The electronic device of claim 1, wherein the physical keypad disposed at the second surface comprises one or more physical keys that control activation of the imaged keys within the imaged keypad.

4. The electronic device of claim 1, further comprising:

a sensor that detects user interaction with the physical keypad disposed on the second surface; and

an image generator that displays within the image display device an imaged representation of the user interaction with the physical keypad disposed on the second surface.

5. The electronic device of claim 4, wherein the sensor comprises one or more of the following sensor types: a motion sensor, a thermal sensor and a pressure sensor.

6. The electronic device of claim 4, wherein the imaged representation of the user interaction comprises an imaged depiction of the user's finger or thumb interacting with the imaged keypad.

7. The electronic device of claim 1, wherein the front and back surfaces are angled relative to one another.

8. The electronic device of claim 1, wherein the image display device is selected from one of the following types of image display devices: liquid crystal displays, digital light processor displays, plasma displays and light emitting diode displays.

9. The electronic device of claim 1, wherein the electronic device is selected from one of the following types of electronic devices: laptop computer, desktop computer, cell phone, personal digital assistant, gaming device, automatic teller machine and data input device.

10. The electronic device of claim 1, wherein the functions of the plurality of imaged and physical keys are user adjustable.

11. The electronic device of claim 1, wherein shapes of the plurality of imaged keys are reconfigurable.

* * * * *